Name:

at1124exam: Radicals and Squares (v804)

Question 1

Simplify the radical expressions.

$\sqrt{28}$ $\sqrt{99}$ $\sqrt{20}$

$\sqrt{2 \cdot 2 \cdot 7}$ $\sqrt{3 \cdot 3 \cdot 11}$ $\sqrt{2 \cdot 2 \cdot 5}$

$2\sqrt{7}$ $3\sqrt{11}$ $2\sqrt{5}$

Question 2

Find all solutions to the equation below:

$$\frac{(x+6)^2 - 4}{9} = 5$$

First, multiply both sides by 9.

$$(x+6)^2 - 4 = 45$$

Then, add 4 to both sides.

$$(x+6)^2 = 49$$

Undo the squaring. Remember the plus-minus symbol.

$$x + 6 = \pm 7$$

Subtract 6 from both sides.

$$x = -6 \pm 7$$

So the two solutions are $x = 1$ and $x = -13$.

Question 3

By completing the square, find both solutions to the given equation. *You must show work for full credit!*

$$x^2 - 16x = 57$$

$$x^2 - 16x + 64 = 57 + 64$$
$$x^2 - 16x + 64 = 121$$
$$(x - 8)^2 = 121$$
$$x - 8 = \pm 11$$
$$x = 8 \pm 11$$
$$x = 19 \quad \text{or} \quad x = -3$$

Question 4

A quadratic polynomial function is shown below in standard form.

$$y = 2x^2 + 16x + 29$$

Express the function in **vertex form** and identify the **location** of the vertex.

From the first two terms, factor out 2 .

$$y = 2(x^2 + 8x) + 29$$

We want a perfect square. Halve 8 and square the result to get 16 . Add and subtract that value inside the parentheses.

$$y = 2(x^2 + 8x + 16 - 16) + 29$$

Factor the perfect-square trinomial.

$$y = 2((x + 4)^2 - 16) + 29$$

Distribute the 2.

$$y = 2(x + 4)^2 - 32 + 29$$

Combine the constants to get **vertex form**:

$$y = 2(x + 4)^2 - 3$$

The vertex is at point $(-4, -3)$.